

Semester	3
Course	BSc Statistics Honours
Paper Code	C2ST230321T
Paper Title	Sampling distributions
No. of Credits	4
Theory / Practical / Composite	Theory
Minimum No. of preparatory hours per week a student has to devote	4
Number of Modules	1
Syllabus	<p>Unit 1: Introduction: Concepts of population and sample, parameter and statistics in the context of theoretical distributions. Notion of sampling distribution of a statistic and its standard error. [5]</p> <p>Unit 2: Functions of random variables: Derivations of distributions of functions of random variables using distribution function, moment generating function and transformation of variables. Concept of Jacobian of transformation. Additive property of independent random variables. Orthogonal and polar transformations. [17]</p> <p>Unit 3: Sampling distributions arising from univariate normal distribution: χ^2, t and F distributions and their properties. Distribution of sample mean and variance. [15]</p> <p>Sampling distributions arising from bivariate normal distribution: Joint Distribution of sample means, variances, correlation coefficient (null case) and regression coefficients. [6]</p> <p>Non Central distributions: Definitions of non-central χ^2, t and F. Simple properties related to non-central distributions (statements only). [3]</p> <p>Unit 4: Order statistics: Sample order statistics and their distributions. Distribution of sample range. [6]</p>

Learning Outcomes	<ul style="list-style-type: none"> ○ To learn concepts of sample and population related to a hypothetical distribution. ○ To find sampling distributions of statistics using different techniques. ○ To learn sampling distributions arising from univariate and bivariate normal distributions. ○ To understand concepts of non-central distributions. ○ To get the notion of order statistics and their sampling distributions. 	
Reading/Reference Lists	<ol style="list-style-type: none"> 1. Goon, A.M. Gupta, M.K. and Dasgupta, B. (2003): An outline of Statistical Theory, Vol. 1, 4th Edn. World Press, Kolkata. 2. Rohatgi V.K. and Saleh, A. K. Md , E. (2009): An Introduction to Probability and Statistics, 3rd edition (Reprint), John Wiley and Sons. 3. Casella, G. & Berger, R.L. (2021): Statistical Inference. Cengage Learning. 4. Mood, A.M.; Graybill, F.A. & Boes, D.C.(1974): Introduction to the theory of Statistics, 3rd edition. McGraw-Hill series. 5. Freund, J.E. (2021): Mathematical Statistics with applications. 8th edition, Pearson. 	
Evaluation	CIA: 30 End-Sem: 70 Total: 100	
Paper Structure for Theory Semester Exam	Short questions (5 marks each)	Long questions (15 marks each)
	5 out of 7	3 out of 5